



Research Archive of Indian Institute of Technology, Hyderabad (RAIITH)

Siva Shankar Kimidi, Mallikarjuna C and Saket Asthana

Abstract

The paper shares the experience related to the development of Institutional Repository (IR) Indian Institute of Technology, Hyderabad (RAIITH) using Open Source software (Eprints). Authors consider that IR needs to be an essential component in any modern higher education and research institution in the present networked society. The benefits of IRs for the scientist/academician and the research institution like greater citation, speedy dissemination and receipt of feed back, coverage of different versions of the research report, ensuring preservation, ease of access and use, self-submission facility, permanent place/ point of access/URL, showcasing of the intellectual achievements of the institution etc are highlighted. The suggestions put forward will be helpful to those intending to establish similar repositories.

Keywords: Institutional Repository (IR), IIT, Hyderabad, Eprints, RAIITH, digital Library, Research.

Introduction

The process of information transfer used to be very lengthy and time taking process. It was earlier very difficult to access the required information from the information generation centres or the traditional libraries. The main reasons behind this are the access restrictions and other barriers existing between the libraries and the users. However, Information and Communication technology changed the scenario by breaking the access barriers and laid the path for digital revolution where the information storage, transfer and retrieval are made very easy for information transfer. Recall time for information retrieval in digital systems has come down as compared to the traditional libraries. To serve the societal goals,

institutions have to accommodate current technologies to overcome the knowledge gap in the society by creating, collecting, storing, processing and distributing of the information.

The digital content produced nowadays is enormous and thereby the role of libraries in providing information has become crucial. Higher educational institutions generate a quantum of digital academic and scholarly content. The crossover from print to electronic databases in the libraries is playing prominent role to collect, archive, maintain and publish the content. Once the resources increased in the traditional library system the retrieval rate also increased. Then dawn the concept of digitization and digital library. The concept of digital library is defined in many

ways. In general, digital libraries are same as traditional library system, except that the material is represented in the digital format.

Traditional libraries gather, compile, catalogue, preserve, and provide access to the research intellect. Institutional repositories (IR) accomplish the same task with the potential incentive of increased accessibility and collaborative efforts, which are created by building a justifiable program. Institutional repositories are a fairly modern innovation among top tier academic institutions and major science and technological institutes, providing open access to the research outputs of teaching, non-teaching and research faculty.

An Institutional Repository (IR) is a digital archive where an institution's intellectual work is made accessible and preserved for posterity. IR will have influence over the full cycle of scholarly communication on campus, from research through publication, collection, and preservation. Libraries play this important role in shaping institutional digital repositories.

According to Clifford Lynch "institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. It is most essentially an organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution. (Lynch, 2003)

In the early 1990s the big push started when most of the academic disciplines started contributing their scholarly work through Open Access publishing. Institutional Repositories have been progressively recognized as an important tool for scholarly communication, source of institutional visibility and a possible source of institutional knowledge organisation. Here the major difference between the traditional

and existing institutional repositories is that authors are potentially the major stakeholders. Acceptance of the target audience and sufficient funding for the long-term visibility makes the Institutional repository (IR) a success.

Relevance of IR

Institutional Repository is an essential component in any higher education and research institution in the present networked society due to the factors like, technological changes; significant increase in the overall volume of research; increasing need of archival and access to unpublished information; increasing demand to access knowledge objects from anywhere at anytime; and increasing uncertainty over who will handle the preservation and archiving of scholarly research materials.

The importance of the standard IR project are summarized by Kamila (2009) as follows:

- It can help to develop a national research repository infrastructure by setting up, populating and linking individual repositories;
- It can stimulate development of services that draw on research information made available through the repository infrastructure;
- It can provide a window that gives open access to improve the sponsoring institution's visibility and status;
- It can support the open-access model of publication.

Benefits of IR

The benefits of IRs for the scientist/academician and the research institution are summarized by Kamila (2009) as follows.

Benefits for the Authors

Greater citation: Studies have shown that articles freely available on the Internet are cited more often than their paper counterparts.

Speed: Faculty members can self-publish their preprints immediately, with the possibility of receiving immediate feedback.

Organisation: An institutional repository can contain all of the scholarly work by one faculty member, including material such as preprints, post-prints, presentations, and classroom materials (dependent on copyright restrictions). Instead of being scattered about in different databases, servers, or computer hard drives, this material can be browsed easily in one place by the user, and reused easily by the contributor.

Preservation: In order to ensure continued access, digital files need to be refreshed and migrated. Ten years from now, we will not be able to open a present word file. Depositing a file into an institutional repository will make repository manager to ensure that such files are updated when technologies change.

Ease of use: Self-submission is possible in institutional repository systems. Library will also support uploading or do all uploading. All that is needed are files to upload and permission to upload it.

Permanent place: Depositing an item into an institutional repository means that it stays in one place and maintains the same URL.

Benefits for the Institution

The scholarly material produced by the organization is available in one place, reflecting the intellectual achievements of the institution, and serving as a valuable marketing tool. Documents reflecting the institutional history, both scholarly and non-scholarly, are preserved for future use, much like a traditional archive preserves paper material. Material that is not traditionally published is included in the repository, including drafts of unpublished articles or book chapters, unpublished research, student works, learning objects, and creative works (Kamila, 2009) .

Institutional Repositories in the IITs

Among the higher education system in India, specifically with respect to technical education, Indian Institutes of Technologies (IIT)s are premium institutes that stand the best in India. The ultimate goal of these premium institutes is to produce a core of knowledgeable professionals from multidisciplinary areas. Par to the standards and the excellence which they have, they are lacking behind to share the knowledge which is been generated in these institutes in the form of research articles, research finding which were presented in reports, conference and symposia, pioneering lectures and teaching materials. These materials are means of referring to further research findings and learning. Institutional repositories (IRs) play the role to archive, curate and disseminate the knowledge in open access domain. The intellectual knowledge sharing through the interoperable repositories enhances the academic status and quality of an institution. Table 1 indicates the availability of IRs in various IITs. Table 2 gives indicates the information sources included in the IRs of various IITs.

Institutional repository of the IIT, Hyderabad

Indian Institute of Technology Hyderabad (IITH) initially used to have an IR making its presence only on intranet. The retrospective IR used to archive all the thesis and dissertations of MSc, M.Tech and PhD courses. The genesis of Research Archives of Indian Institute of Technology Hyderabad (RAIITH) took place in the year 2014. Eprints was initially installed on a personal computer desktop to test the features by uploading very few records, then could manage to do at most research on the test bed by increasing the addition of records to the database in the form of multiple type of documents (viz., Article, Book chapter, conference proceeding, Thesis, Patent, monograph etc.) Also this gave a scope to

Table 1: Institutional Repositories in IITs

Sl. No	Name	Year of est.,	Acronym	State	IR in public domain	Software
1	IITKharagpur	1950	IITKGP	West Bengal	Available	Dspace
2	IIT Mumbai	1958	IITB	Maharashtra	Available	Dspace
3	IITMadras	1959	IITM	Tamil Nadu	Available	
4	IIT Kanpur	1959	IITK	Uttar Pradesh	Intranet	
5	IIT New Delhi	1961	IITN	Delhi	Available	Eprints
6	IIT Guwahati	1995	IITG	Assam	Available	Dspace
7	IITRoorkee	2001	IITR	Uttarakhand	-	-
8	IITGandhinagar	2008	IITGN	Gujarat	Available	Dspace
9	IITBhubaneshwar	2008	IITBBS	Odisha	Available	Dspace
10	IITJodhpur	2008	IITJ	Rajasthan	Available	Dspace
11	IIT Hyderabad	2008	IITH	Telangana	Available	Eprints
12	IIT Patna	2008	IITP	Bihar	Intranet	Dspace
13	IIT Ropar	2008	IITRPR	Punjab	Intranet	Dspace
14	IIT Indore	2009	IITI	Madhya Pradesh	Intranet	Dspace
15	IIT Mandi	2009	IITMandi	Himachal Pradesh	Not available	Not available
16	IIT(BHU) Varanasi	2012	IIT(BHU)	Uttar Pradesh	Not yet initiated	Not available
17	IIT(ISM) Dhanbad	2016	IIT(ISM)	Jharkhand	Not yet initiated	Not available
18	IIT Tirupathi	2016	IITTP	Andhra Pradesh	Not yet initiated	Not available
19	IIT Palakkad	2016	IITPKD	Kerala	Not yet initiated	Not available
20	IITDharwad	2016		Karnataka	Not yet initiated	Not available
21	IIT Goa	2016	IITGoa	Goa	Not yet initiated	Not available
22	IIT Bhilai	2016	IITBhilai	Chhatisgardh	Not yet initiated	Not available
23	IIT Jammu	2016		Jammu	Not yet initiated	Not available

add few more plug ins to the existing software for better output. Then the database mirrored on to an individual blade server with sufficient hardware requirements. Eprints 3.2 was installed on the test bed and then could later update to the versions 3.3.12 and 3.3.15

IR Package- Eprints

Integration of data elements in Eprints is quite a good model where the drawings and

text images can be combined and updated. The integration part of information and updating of the research content at various stages in Eprints at the author drafting stage and publication process is easy. ROAR statistics says that there are 611 institutional repositories (IRs) installed worldwide, using Eprints software of various available versions. In India there are 109 repositories hosted using different open source software. Almost all the CSIR laboratories setup their

Table2: Information sources in IIT IRs.

Sl. No	Institute	Articles	Book Section	Monograph	Conference or workshop item	Book	Thesis	Patent	Teaching resource	other
1	IIT Kharagpur	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	IIT Mumbai	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	IIT Madras	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	IIT Kanpur	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	IIT N Delhi	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	IIT Guwahati	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
7	IIT Roorkee	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
8	IIT Gandhi.nr	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
9	IIT Bhub.ar	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	IIT Jodhpur	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	IIT Hyderabad	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes

in-house IRs using Eprints and DSpace software.

Content Management in RAIITH

RAIITH was initially established with 554 records of institute’s research output in the form of thesis (viz. M.Sc., M.Tech, Ph.D.). The pdf format of these records have been gathered and could successfully add to the newly installed eprints IR from the retrospective in-house repository. Later the content of the IR slowly increased its pace by collecting all the research publication from the major bibliographic database via Scopus. From the year 2015 onwards IIT Hyderabad

Library team started collecting the research publications from another pioneered bibliographic database, Web of Science (WoS). RAIITH holds preprints, post-prints, open access articles, conference papers, monographs, book chapters, IITH news articles and patents. Most of them cover the major research areas involved at Indian Institute of Technology and a small number of them cover a wider subject base. Figure 1, a screenshot, indicates the document types and figure 2 indicate the divisions included in RAIITH.

Table 3 depicts the resource type and number of the resources in RAIITH.

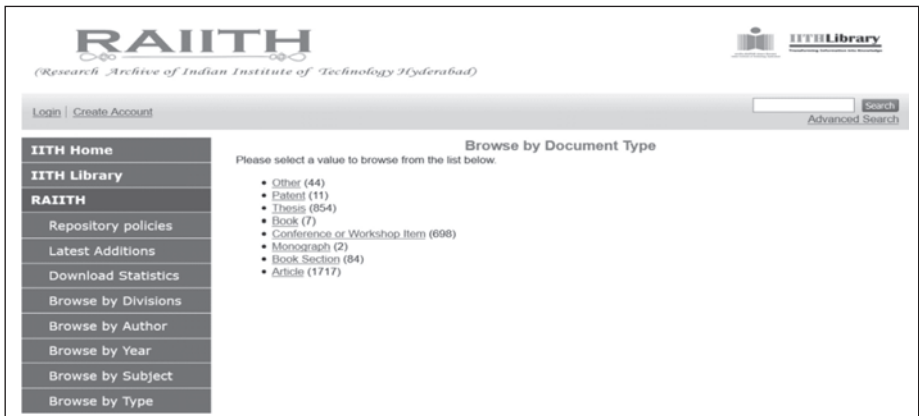
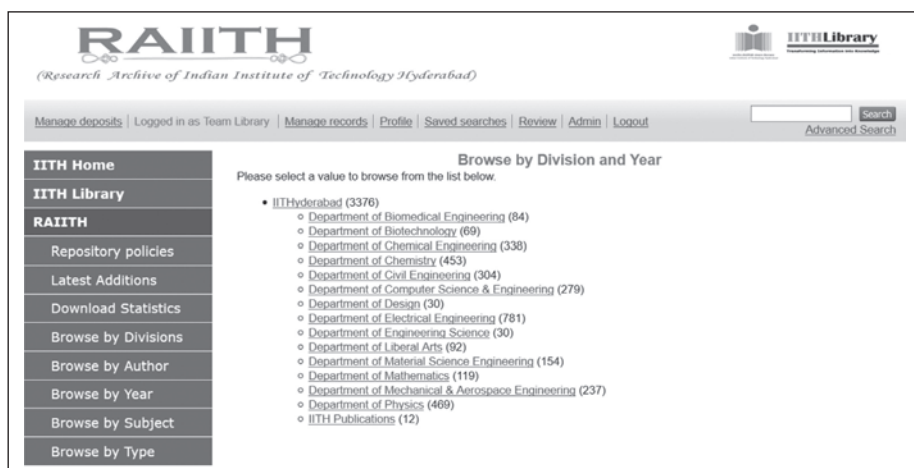


Figure 1: RAIITH - Document Types



RAIITH
(Research Archive of Indian Institute of Technology Hyderabad)

Manage deposits | Logged in as Team Library | Manage records | Profile | Saved searches | Review | Admin | Logout

Browse by Division and Year
Please select a value to browse from the list below.

- IITHHyderabad (3376)
 - Department of Biomedical Engineering (84)
 - Department of Biotechnology (69)
 - Department of Chemical Engineering (338)
 - Department of Chemistry (453)
 - Department of Civil Engineering (304)
 - Department of Computer Science & Engineering (279)
 - Department of Design (30)
 - Department of Electrical Engineering (781)
 - Department of Engineering Science (30)
 - Department of Liberal Arts (92)
 - Department of Material Science Engineering (154)
 - Department of Mathematics (119)
 - Department of Mechanical & Aerospace Engineering (237)
 - Department of Physics (469)
 - IITH Publications (12)

Figure 2: RAIITH – Divisions

Table 4 depicts the deposits to RAIITH and Table 5 depicts the average of deposits for 4 consecutive years 2014 -2017.

Access

RAIITH allow free access to abstracts without any necessary registration. For the full text article from the repository, a request is to be made by clicking the link 'Request a copy' that shall send a mail to the RAIITH admin as-well-as to the first author or the concerned supervisor of the article or thesis. RAIITH follow the embargo period of 3 years for MTech thesis and 5 years for Ph.D. thesis from the date of submission in library. The

Table 3: RAIITH – Resource type and Strength

Resource	Strength
Article	1717
Thesis	854
Conference	698
Book Section	84
Other	44
Book	7
Patent	11
Monograph	2
	3417

Table 4: RAIITH - Deposits

Month	Deposits Count			
	2014	2015	2016	2017
Jan		46	77	71
Feb		28	55	41
Mar		73	37	60
Apr		45	40	59
May		67	123	0
Jun		66	81	142
Jul		134	69	130
Aug		149	116	62
Sep	119	64	85	79
Oct	247	38	64	45
Nov	465	46	57	35
Dec	222	41	39	0
TOTAL	1053	797	843	724

pre/post prints of the research articles, conference papers and other research findings collected from the students/researchers are archived in RAIITH. Presently, RAIITH provides access credentials only to the faculty of IITH enabling them to self-archive their content without the intervention of library staff. Repository admin review the uploads to get the research indexed and harvested by the major harvester like BASE, Google scholar, OAISTER etc

Table 5: Average of Deposits in RAIITH

Month	Deposits Average			
	2014	2015	2016	2017
Jan		219	113	95
Feb		187	110	93
Mar		171	106	92
Apr		155	102	91
May		145	103	88
Jun		137	102	90
Jul		137	101	91
Aug		138	101	90
Sep	119	132	101	90
Oct	183	125	99	89
Nov	277	120	98	87
Dec	263	115	96	0
TOTAL	842	1781	1232	996
				4851

Copy right, Altmetrics

Content of RAIITH is based on Sherpa/RoMEO for archival of information. Altmetrics, the new metrics for analysing and informing scholarship based on the social web, focus on web influence and refers to a range of measures of research impact that go beyond citations. It measure the number of times a research output gets cited, tweeted, liked, shared, viewed or discussed. It harvests open access journals, citation databases which index scholarly articles, web-based research sharing services, and social media. One such analysis on RAIITH is given as Fig 3 and 4 .

Usage Statistics

Currently RAIITH holds 3,418 records having 30,538 download with 47% (1606 documents) full text and 22% (752



Figure 3: RAIITH and Altmetric I

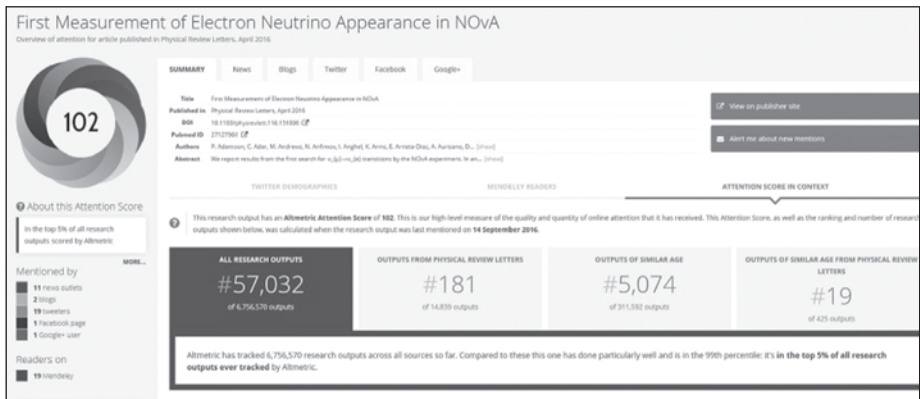


Figure 4: RAIITH and Altmetrics II

Table 6: RAIITH – Downloads Count

Month	Count			
	2014	2015	2016	2017
Jan		58	238	693
Feb		14	250	1054
Mar		66	324	2050
Apr		46	301	1285
May		110	1339	
Jun		134	3365	740
Jul		399	722	1476
Aug		309	1392	2063
Sep		121	652	1903
Oct	33	270	920	2100
Nov	58	269	760	2256
Dec	86	364	1724	
Total	177	2160	12658	15620
Grand Total				30615

Table 7: RAIITH – Average Downloads

Month	Count			
	2014	2015	2016	2017
Jan		58	238	693
Jan		58	160	560
Feb		49	166	577
Mar		52	174	626
Apr		51	181	647
May		58	239	627
Jun		67	388	630
Jul		100	403	655
Aug		119	446	695
Sep		119	455	729
Oct	33	131	473	766
Nov	45	155	484	805
Dec	59	160	530	
Total	137	1119	4124	7317
Grand Total				12697

documents) open access. The repository became popular and could reach to the maximum globally, the IR registered its presence with most popular harvesting search engines like BASE, Google scholar and OAISTER. Table 6 gives download count and Table 7 gives average downloads of RAIITH.

Search Interface

The repository is searchable by a Basic search interface and also an advanced search. For a quick reach, the users can easily get connected to the repository by browsing by author, year, subject and type of information. The recently added content to the repository can be viewed under Latest Additions.

Conclusion

Building open scholarly repositories, institutional repositories, digital libraries, etc are necessary for the visibility of research carried out by an institution. IRs enhance the idea of rebuilding trust between the library and the users. IRs make the libraries to feel that it act as a vehicle to carry forward research with visibility and openness of the

work, offering more citations. IRs also act as a platform for collaborative research among internationally distributed IRs.

References:

- Alemu, G. A. (2011). The Role of Open Access in Fostering Knowledge Sharing and Collaboration in Ethiopia: A Case Study *Qualitative and Quantitative Methods in Libraries* (pp. 262-274): World Scientific.
- Arano, S., Martinez, G., Losada, M., Villegas, M., Casaldaliga, A., & Bel, N. (2011). The community “resources and primary data” of the Universitat Pompeu Fabra: institucional repositories as scientific infrastructures: a case study. *Revista Espanola De Documentacion Cientifica*, 34(3), 385-407. <http://dx.doi.org/10.3989/redc.2011.3.834>
- Bamigbola, A. A. (2014). Surveying Attitude and Use of Institutional Repositories (IRs) by Faculty in Agriculture Disciplines: A Case Study. In G. Giannakopoulos, D. P. Sakas, D. Birdie, C., & Vagiswari, A. (2007). Towards establishing an Open Access repository of Indian publications in astronomy - a case study of Indian Institute of Astrophysics repository, *Library and Information Services in*

Astronomy V, (Vol. 377, pp. 128-135).

Carlson, J., Ramsey, A. E., & Kotterman, J. D. (2010). Using an institutional repository to address local-scale needs: a case study at Purdue University. *Library Hi Tech*, 28(1), 152-173. <http://dx.doi.org/10.1108/073788310111026751>

Clifford A. Lynch (2003). Institutional Repositories: Essential Infrastructure for Scholarship in the Digital Age. *ARL: A Bimonthly Report*, no. 226

Danielle Barandiaran, B. R. a. B. T. (2014). Focusing on student research in the institutional repository. *C&RL News*, 546-549.

Diaz, J., Schiavoni, A., Amadeo, A. P., & Charnelli, M. E. (2013). Building An Institutional Repository With Multiple Publishing Ways. A Case Study. *6th International Conference of Education, Research and Innovation (ICERI)*, (pp. 2446-2453).

Ferreras-Fernandez, T., Merlo-Vega, J. A., & Garcia-Penalvo, F. J. (2013). Impact of Scientific Content in Open Access Institutional Repositories. A case study of the Repository Gredos. *First International Conference on Technological Ecosystem for Enhancing Multiculturality (Teem'13)*, 357-363. <http://dx.doi.org/10.1145/2536536.2536590>

Hulagabali, S. C. (2015). Institutional Repositories Initiated by Indian Institutes of Technology and Indian Institutes of Management: A Case Study. *Desidoc Journal of Library & Information Technology*, 35(4), 293-298.

IITH launches online repository of research archives. (2014, December 5). Retrieved from <http://economictimes.indiatimes.com/>

Kamraninia, K., & Abrizah, A. (2010). Librarians' role as change agents for institutional repositories: A case of Malaysian academic libraries. *Malaysian Journal of Library & Information Science*, 15(3), 121-133.

Kanchan Kamila. Institutional Repository Projects in India. 7th International CALIBER 2009 Institutional Repository Projects in India. 128-132.

Koler-Povh, T., Mikos, M., & Turk, G. (2014). Institutional repository as an important part of scholarly communication. *Library Hi Tech*, 32(3), 423-434. <http://dx.doi.org/10.1108/lht-10-2013-0146>

Lee, J., Burnett, G., Vandegrift, M., Baeg, J. H., & Morris, R. (2015). Availability and accessibility in an open access institutional repository: a case study. *Information Research-an International Electronic Journal*, 20(1), 16.

Lynch, C. Institutional Repositories: Essential Infrastructure for Scholarship in the Digital Age. *ARL Bimonthly Report*, 2003, p. 226. www.arl.org/newsltr/226/ir.html (retrieved April 21, 2004).

Palmer, C. L., Teffau, L. C., & Newton, M. P. (2008). Strategies for Institutional Repository Development: A Case Study of Three Evolving Initiatives. *Library Trends*, 57(2), 142-167.

Serrano-Vicente, R., Melero, R., & Abadal, E. (2016). Open Access Awareness and Perceptions in an Institutional Landscape. *Journal of Academic Librarianship*, 42(5), 595-603. <http://dx.doi.org/10.1016/j.acalib.2016.07.002>

Simpson, P., & Hey, J. (2006). Repositories for research: Southampton's evolving role in the knowledge cycle. *Program-Electronic Library and Information Systems*, 40(3), 224-231. <http://dx.doi.org/10.1108/00330330610681303>

Sutradhar, B. (2006). Design and development of an institutional repository at the Indian Institute of Technology Kharagpur. *Program-Electronic Library and Information Systems*, 40(3), 244-255. <http://dx.doi.org/10.1101/00330330610681321>

van Wyk, B., & Mostert, J. (2011). Toward Enhanced Access to Africa's Research and Local Content: A Case Study of the Institutional Depository Project, University of Zululand, South Africa. *African Journal of Library Archives and Information Science*, 21(2), 133-144.

Walker, L. (2016). Making Institutional Repositories Work. *College & Research Libraries*, 77(5), 675-676. <http://dx.doi.org/10.5860/crl.77.5.675>